

## CLAIMS

### What is claimed is:

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1. A self-adhesive prepreg for bonding to a honeycomb, said self-adhesive prepreg comprising:  
at least one fiber layer;  
a resin which has been combined with said fiber layer to form a prepreg which includes a bonding surface that is adapted to be bonded directly to said honeycomb, said resin comprising a thermoset resin, a curing agent and a sufficient amount of a viscosity control agent to provide a resin having a viscosity which is sufficient to allow said resin to be combined with said fiber layer to form said prepreg; and  
thermoplastic fillet forming particles which are incorporated into said resin in an amount sufficient to form a prepreg resin which is self-adhesive and wherein said fillet forming particles are not dissolved to a substantial degree in said prepreg resin.
2. A self-adhesive prepreg according to claim 1 wherein said thermoset resin is selected from the group consisting of epoxy and cyanate ester resins.
3. A self-adhesive prepreg according to claim 1 wherein said thermoplastic fillet forming particles are selected from the group consisting of densified and micronized thermoplastic particles which have a glass transition temperature that is above 200°C.
4. A self-adhesive prepreg according to claim 1 wherein said thermoplastic fillet forming particles are selected from the group consisting of densified polyether sulfone, micronized polyether sulfone and densified polyetherimide.
5. A self-adhesive prepreg according to claim 3 wherein said thermoplastic fillet forming particles have particle sizes ranging from 1 to 100 microns.
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6. A self-adhesive prepreg according to claim 1 wherein said prepreg resin comprises an epoxy thermoset resin, a polyetherimide or polyethersulfone viscosity control agent and densified polyether sulfone fillet forming particles.
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7. A self-adhesive prepreg according to claim 1 wherein the minimum viscosity of said prepreg resin over the curing temperature range of said prepreg resin is between 150 to 1500 poise.

8. A self-adhesive prepreg according to claim 1 wherein the minimum viscosity of said prepreg resin over the curing temperature range of said prepreg resin is between 300 to 1200 poise.

9. A self-adhesive prepreg according to claim 1 wherein said thermoplastic fillet forming particles are located substantially at said bonding surface of said prepreg.

10. A cured honeycomb panel comprising a core having at least one face to which a self-adhesive prepreg according to claim 1 is bonded and wherein said thermoplastic fillet forming particles are substantially dissolved in said prepreg resin.

11. A cured honeycomb panel comprising a core having at least one face to which a self-adhesive prepreg according to claim 3 is bonded and wherein said thermoplastic fillet forming particles are substantially dissolved in said prepreg resin.

12. A cured honeycomb panel comprising a core having at least one face to which a self-adhesive prepreg according to claim 5 is bonded and wherein said thermoplastic fillet forming particles are substantially dissolved in said prepreg resin.

13. A cured honeycomb panel comprising a core having at least one face to which a self-adhesive prepreg according to claim 6 is bonded and wherein said thermoplastic fillet forming particles are substantially dissolved in said prepreg resin.

14. A cured honeycomb panel comprising a core having at least one face to which a self-adhesive prepreg according to claim 7 is bonded and wherein said thermoplastic fillet forming particles are substantially dissolved in said prepreg resin.

15. A cured honeycomb panel comprising a core having at least one face to which a self-adhesive prepreg according to claim 8 is bonded and wherein said thermoplastic fillet forming particles are substantially dissolved in said prepreg resin.

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16. A cured honeycomb panel comprising a core having at least one face to which a self-adhesive prepreg according to claim 9 is bonded and wherein said thermoplastic fillet forming particles are substantially dissolved in said prepreg resin.

17. A method for adhesively bonding a prepreg face sheet to a honeycomb comprising the steps of: forming a self-adhesive prepreg comprising providing at least one fiber layer and a prepreg resin wherein said prepreg resin is combined with said fiber layer to form a prepreg resin layer comprising a bonding surface which is adapted to be bonded directly to said honeycomb, said prepreg resin comprising a thermoset resin, a curing agent and a sufficient amount of a viscosity control agent so that said prepreg resin has a viscosity which is sufficient to allow said prepreg resin to be combined with said fiber layer to form said prepreg resin layer, said step of forming a self-adhesive prepreg further including the step of incorporating thermoplastic fillet forming particles into said prepreg resin in an amount sufficient to form a prepreg layer which is self-adhesive and wherein said fillet forming particles are not dissolved to a substantial degree in said prepreg resin; bonding said self-adhesive prepreg to said honeycomb wherein said bonding comprises curing said self-adhesive prepreg for a sufficient time and at a sufficient temperature to substantially dissolve said fillet forming particles.

18. A method according to claim 17 wherein said thermoset is selected from the group consisting of epoxy and cyanate ester resins.

19. A method according to claim 17 wherein said thermoplastic fillet forming particles are selected from the group consisting of densified and micronized thermoplastic particles which have a glass transition temperature that is above 200°C.

20. A method according to claim 17 wherein said thermoplastic fillet forming particles are selected from the group consisting of densified polyether sulfone, micronized polyether sulfone and densified polyetherimide.

21. A method according to claim 18 wherein said thermoplastic fillet forming particles have particle sizes ranging from 1 to 100 microns.

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22. A method according to claim 17 wherein said prepreg resin comprises an epoxy thermoset resin, a polyetherimide or polyethersulfone viscosity control agent and densified polyether sulfone fillet forming particles.

23. A cured honeycomb sandwich panel comprising a core having at least one face to which a self-adhesive prepreg according to claim 1 is bonded and wherein said thermoplastic fillet forming particles are substantially dissolved in said prepreg resin and wherein said honeycomb exhibits a core crush of less than 5%.

24. A cured honeycomb sandwich panel according to claim 23 wherein said fabric layer comprises 6K or 12K carbon fabric.

25. A cured honeycomb sandwich panel according to claim 24 wherein said fabric layer comprises 6K or 12 K carbon fabric and said honeycomb exhibits a core crush which is essentially 0%.

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FOOTNOTES